Bridging the Health Disparity of African Americans Through Conversational Agents

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African Americans have faced health disparities in terms of access to health care and treatment of illnesses. The novel coronavirus disease 2019 pandemic exacerbates those disparities caused by limited access to medical care and healthy lifestyles, vulnerability to misleading information, and mistrust of the medical profession, all of which disproportionately affect the African American population in terms of infection and mortality. Conversational agents (CAs) are a technological intervention with the potential to narrow the disparities because they make health care more accessible, are effective in disseminating health information among a population with low health literacy, and can increase users' trust in health information. However, designing CAs for this population presents challenges with regard to embodying the African American culture into CAs and addressing privacy and security concerns. This commentary discusses some advantages and challenges of using CAs to help African Americans protect themselves against coronavirus disease 2019, and calls for more research in this area.

1 INTRODUCTION

African Americans have faced vast disparities in accessibility to health care and health information, leading to a wide gap in contracting illnesses. Medical studies have shown that African Americans experience a disproportionate amount of diet-related diseases such as obesity, diabetes, cardiovascular disease, cancer, and stroke [2, 13, 16, 36, 44, 56] compared to other ethnicities. This disparity in health care is derived from multiple factors. Financial factors in low-resource localities, such as poor housing conditions [54] and lack of proximity to stores that sell healthy foods [1], have contributed to African Americans' poor health. Their low income results in a lack of health insurance and transportation, both of which prevent them from going to hospitals when necessary [25, 59]. Social factors such as low level of education [38], low literacy [42], and low health literacy [53] aggravate their inefficient health management [15, 46], creating a barrier between the African American community

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and the knowledge necessary to maintain a healthy lifestyle [20, 55]. Additionally, lack of access to technology and low digital literacy create a "digital divide" that prevents many in the African American community from benefiting from appropriate knowledge regarding health and well-being [43, 52].

The coronavirus disease 2019 (COVID-19) pandemic has further widened existing health disparities. African Americans are known to be more prone to infection and more likely to experience severe outcomes. According to statistics from the U.S. Centers for Disease Control and Prevention, African Americans represent 32.2% of the population in the state of Louisiana yet have accounted for more than 70% of COVID-19 deaths [17]. In New York, the African American and Hispanic populations represent 22% and 29% of the population, respectively, yet account for 28% and 34% of COVID-19 deaths, respectively [45]. Scholars have suggested that several factors contribute to the wide disparity in the spread of infections and high death rates among the African American population, such as disproportionately high comorbidities and people living in overcrowded areas [30]. Yancy [66] emphasized that factors other than comorbidities come into play, such as the living conditions faced by most African Americans. Most African Americans live in poor, densely populated areas with high crime rates and limited access to healthy food, and are unlikely to have jobs that allow them to engage in proper social distancing by working from home or telecommuting. Misinformation about COVID-19 and medical mistrust also undermine this marginalized population [32, 33, 48]. Such limited access to medical care and healthy lifestyle, vulnerability to false information, and medical mistrust present an opportunity for technological intervention, which studies have shown can increase accessibility to medical care [7] and provide accurate health information for African Americans [38].

To help with the challenges African Americans face in the time of COVID-19, we consider conversational agents (CAs) as a promising potential technological intervention. CAs refer to computer-generated animated or embodied characters that use conversational interfaces to interact with humans [11]. Currently, CAs are in the early stages of being used in the health care sector. CAs have shown effectiveness in delivering self-management information [49, 51], serving as a diagnostic tool [50], and providing emotional support [35]. Studies have also focused on how CAs can benefit marginalized populations. Bredice et al. [8] studied the acceptability of CA computer applications that provided health education for Hispanic women. A study by Jack et al. [32] demonstrated how CAs can be used to reduce health disparities for African American women with low health literacy. The authors found that after an experimental group of women used a CA for delivering preconception health risk information, the women had lower risks compared to a control group, and the women found the CA "easy to talk to."

Regarding COVID-19, agents are being used to curb the spread of the virus and provide emotional support [12, 62, 65]. However, no study has explored and measured the impact of CAs on health disparities in light of COVID-19. Cas' distinct characteristics, such as automated dialogues, personalized interactions, and empathic qualities, can help improve the health disparities in the African American population through increasing accessibility to health care, benefiting those with low health literacy and increasing users' trust in health information.

In this commentary, we argue that CAs can act as interventions specifically focused on African Americans by addressing the crucial advantages of CAs that correspond to specific factors that make African Americans vulnerable to COVID-19. We also point out specific barriers or challenges that African Americans may face when using the agents. Studies have shown that African Americans face barriers to technology, such as concerns about security and privacy [58]. We show how these barriers also apply when this population interacts with CAs. This article answers the following questions: What are the advantages of African Americans using CAs to protect themselves against COVID-19 infection? What are the challenges in designing those agents? Through this process, we call for more studies on CAs being used for protection against COVID-19 infections in African Americans.

2 BENEFITS OF USING CAS AGAINST COVID-19

Several characteristics of CAs make them useful against COVID-19 in the African American population. First, CAs can make health care more accessible. Increased accessibility is crucial because much of the health disparity

is a result of the imbalance in health care accessibility [7]. Accessibility refers to physical distance to physicians [9, 47] and quality care [40], and the ability to access trustworthy health information [7]. When their automation eliminates physical constraints, CAs provide a range of health care options for people from low socioeconomic backgrounds by increasing access to health information and intervention [22, 28]. CAs are also perceived as a fast and reliable source of information [23]. In light of COVID-19, accessibility to health resources is crucial because it can directly affect infection and mortality rates [34]. CAs provided with adequate information storage and natural language capabilities can provide vital information such as the number of cases within the community, the availability of hospitals that care for those who have contracted COVID-19, and where and how to get tested for the virus. Such a resource would make a significant difference in the African American community.

The second advantage of CAs in closing health disparities for African Americans is that CAs can benefit those with low health literacy by delivering understandable and personalized health information. Health literacy is defined as the essential skills needed for people to find, understand, evaluate, communicate, and use information and services to promote health and well-being [57]. The importance of health literacy has risen in light of the COVID-19 pandemic because of the infodemic it causes [57]. A lot of false health information is derived from untrustworthy sources, and citizens must be armed with adequate health literacy to combat such misinformation [14]. Moreover, delivering comprehensive and accurate health information to those with low health literacy is important. When people are equipped with the necessary knowledge, they can take appropriate steps to maintain their health. A study on African Americans with low health literacy showed that they believed themselves to be less likely to contract the virus yet still less prepared against it [64]. The benefit of using CAs is that they can support such a low health literacy population by correcting ill-informed beliefs about the spread of the virus [5, 6]. Bickmore et al. [6] developed embodied CAs that convey health information to patients with low health literacy. They found that the agents resulted in high satisfaction levels and ease of use regardless of the users' literacy level. The capability of CAs to personalize engagement strategies according to the needs of each user [60] should enable them to adapt to the health literacy of each individual by using more understandable layman's terms.

Finally, CAs can benefit the African American population by increasing their trust in the health care system. Many African Americans have mistrusted the medical system for a long time [26] because of perceived discrimination [18] and an inherent lack of confidence in their treatment [63]. This mistrust was found to contribute to African Americans' reluctance to visit the hospital except in an emergency [63]. In the case of COVID-19, they might arrive at hospitals after the infection has already entered the inflammatory phase, posing a greater risk to their health [27]. Trust in the medical system is crucial during the pandemic because following the public health agencies' guidelines is the only sure way to curb the spread of the disease. Without trust and confidence in the health system, people do not comply with its rules and regulations, leading to counterproductivity in effective control of the infection [24]. Moreover, if people do not look to the health care system for guidance, they are likely to obtain information from less reputable sources such as social media, where misinformation abounds. Many studies have proved that CAs can increase people's level of trust [3, 4, 39]. Compared to health information delivered by humans, messages delivered by a CA were perceived to be more trustworthy [3]. The same information was deemed more trustworthy when delivered through a CA than communicated via conventional text sources, even more so when the CA demonstrated empathic qualities by establishing rapport [1]. This shows that a CA's ability to simulate empathy works to alleviate afflicted populations' emotional burden, as studied by Welch et al. [62], and increase people's trust. African Americans may benefit from the empathetic qualities of CAs and trust their information more than that found on websites, on the news, or from health institutions.

3 CHALLENGES IN DESIGNING CAS FOR AFRICAN AMERICANS

However, CA designers must still consider challenges in designing CAs to address the African American population. These challenges are also areas to be explored by future studies. We have identified two specific challenges

based on our literature reviews. The first is determining how best to embody the African American culture into the CAs. Studies have shown that African Americans have less trust in Caucasian doctors than in African American doctors because they feel Caucasian doctors do not understand their culture [29]. The familiarity of language also affects how African American patients perceive caregivers [31]. It would be a challenge to create a CA persona with which African Americans could empathize and identify. There is still room to explore whether this population would feel more empowered by and trusting toward a specific CA persona. We do not know whether this population would be better served by human or robotic agent personas. Community is another important aspect of embedding culture into a CA, in that African Americans want doctors with similar cultural backgrounds. For many African Americans, cultural sensitivity and competence is an important aspect of their trust in health providers and their adherence to health providers' advice [37]. Therefore, enriching the conversation by embedding cultural knowledge in a CA should strengthen the stated advantages of increasing users' trust and disseminating valuable health information.

The second challenge is to address privacy and security concerns of African Americans, who have strongly expressed concerns about the security of their data in technology such as platforms for the sharing economy [19], text-message-based health interventions [10], and CAs [21]. African Americans with stigmatizing diseases such as human immunodeficiency virus have expressed that their anonymity should be protected and notifications or reminders should be minimized [21]. Transparency regarding how data are used and stored is also important in developing and maintaining African Americans' trust. Because health information is sensitive and personal, African Americans want trusted entities controlling their data [61]. African Americans might suspect that CAs are vulnerable to security threats or an invasion of their privacy. A study showed that low-resource African Americans with low digital literacy expressed concerns over technology and computers [58], which could be exacerbated by the novelty and unfamiliarity of CAs. Any ambiguity in who operates a CA and is responsible for its data might lead to further mistrust toward the medical system. Ways of ensuring the security of data disclosed by an individual through dialogues must be studied, especially in the case of COVID-19 because of its profound stigmatization [41].

4 CONCLUSION

We urge the scientific community to conduct further research on how CAs can work for the general public and close the gap between digital technology and marginalized groups. If CAs are designed to effectively address known challenges, they could support the African American community by increasing people's access to health care and health information. Increased access to the right information is imperative to building trust between a community and a health system that has seemed foreign to them. Addressing these concerns and taking appropriate measures to limit users' concerns will improve their health literacy. Making an effort to be culturally sensitive demonstrates a willingness to adjust and change, which might seem like a small step but could be what ultimately makes the greatest difference in bridging the health gap.

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